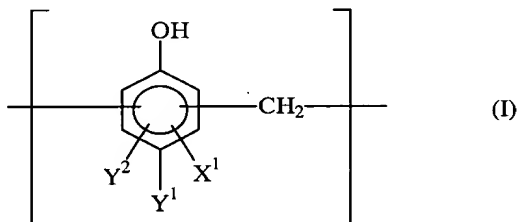


A1
cont
date of 31 July 1997, which claims the priority of a Japanese patent application number H8-219282, filed on August 1, 1996.

IN THE CLAIMS:

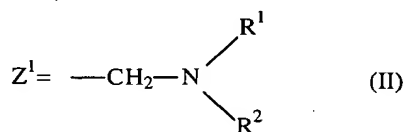
133 14330
Please cancel claims 2-13 and add new claims 14-35 as follows.

A2
R-126
bb1
14
19. (New) A metal-coating-film laminate system comprising:
a metal substrate;
a coating applied to the metal substrate; wherein
said coating has a thickness that is from 5 to 500 nm;
said coating has a content of carbon atoms that corresponds to from 5 to 500 mg/m² of the coating area;
said coating covers at least 90% of the surface of the metal; and
said coating comprises polymer molecules that comprise units conforming to general formula (I):



in which:

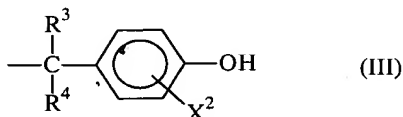
X¹ independently in each structural unit is a hydrogen atom or a moiety Z¹ conforming to general formula (II):



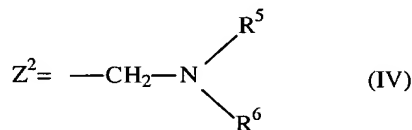
in which each of R¹ and R² independently is a hydrogen atom, a C₁ to C₁₀ monovalent alkyl moiety, or a C₁ to C₁₀ monovalent hydroxyalkyl moiety;

*A2
cont*

Y^1 , independently for each unit, is a hydrogen atom, a hydroxyl group, a C_1 to C_5 alkyl moiety, a C_1 to C_5 hydroxyalkyl moiety, a C_6 to C_{12} aryl, benzyl, or benzo moiety, or a moiety conforming to general formula (III):



in which, independently for each unit according to general formula (I) in which Y^1 conforms to general formula (III), each of R^3 and R^4 is independently a hydrogen atom, a C_1 to C_{10} alkyl moiety, or a C_1 to C_{10} hydroxyalkyl moiety, and X^2 is a hydrogen atom or a moiety Z^2 conforming to general formula (IV):



in which each of R^5 and R^6 is independently a hydrogen atom, a C_1 to C_{10} alkyl moiety, or a C_1 to C_{10} hydroxyalkyl moiety; and

Y^2 , independently for each unit, is a hydrogen atom or, when Y^1 and Y^2 are bonded to adjacent carbon atoms in the aromatic ring shown in general formula (I), Y^1 and Y^2 , and said adjacent carbon atoms to which Y^1 and Y^2 are bonded together may constitute a condensed benzene ring,

said polymer molecules that comprise structural units conforming to general formula (I) having a total number of Z^1 and Z^2 moieties and a distinct (but not necessarily unequal) total number of (i) units conforming to general formula (I) and (ii) Y^1 moieties that conform to general formula (III), such that the total number of Z^1 and Z^2 moieties has a ratio to the total number of units conforming to general formula (I) and Y^1 moieties that conform to general formula (III) that is from 0.2:1.0 to 1.0:1.0; and

a film applied to the coating.

15
20. (New) A metal-coating-film laminate system according to claim 19, in which Y¹ in general formula (I) conforms to general formula (III).

16
21. (New) A metal-coating-film laminate system according to claim 19, in which the coating comprises a total of at least 0.1 mg/m² of phosphorus atoms present in phosphoric acid-like compounds and silicon atoms present in organosilicon compounds.

17
22. (New) A metal-coating-film laminate system according to claim 20, in which the coating comprises a total of at least 0.1 mg/m² of phosphorus atoms present in phosphoric acid-like compounds and silicon atoms present in organosilicon compounds.

18
23. (New) A metal-coating-film laminate system according to claim 19, wherein:

said coating has a thickness in a range from 50 to 300 nm; and

said coating has a content of carbon atoms that corresponds to from 50 to 200 mg/m² of the coating area.

19
24. (New) A metal-coating-film laminate system according to claim 19 in which the coating system is applied to the metal substrate as a reactive coating.

20
25. (New) A metal-coating-film laminate system according to claim 19 in which the coating system is applied to the metal substrate as a dry-in-place coating.

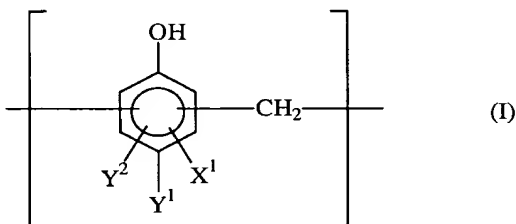
21
26. (New) A metal-coating-film laminate system according to claim 19 in which the metal substrate is selected from the group consisting of iron, steel, and aluminum.

22
27. (New) A method of use of a coating composition in a film laminating process, comprising the steps of:

(1) providing a surface of a metal substrate with the coating composition so that the metal substrate is suitable for laminating a film thereto, said method comprising the steps of:

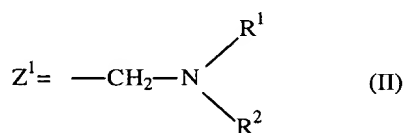
(I) preparing the coating composition by providing a waterborne composition that comprises water and:

(A) at least 0.01 g/L of polymer molecules comprising units conforming to general formula (I):



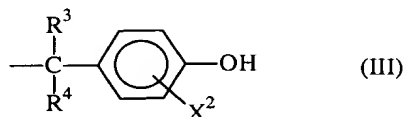
in which:

X^1 , independently in each structural unit, is a hydrogen atom or a moiety Z^1 conforming to general formula (II):

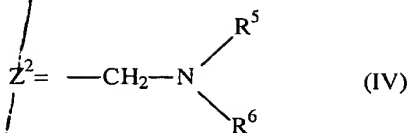


in which each of R^1 and R^2 independently is a hydrogen atom, a C_1 to C_{10} monovalent alkyl moiety, or a C_1 to C_{10} monovalent hydroxyalkyl moiety;

Y^1 , independently for each unit, is a hydrogen atom, a hydroxyl group, a C_1 to C_5 alkyl moiety, a C_1 to C_5 hydroxyalkyl moiety, a C_6 to C_{12} aryl, benzyl, or benzo moiety, or a moiety conforming to general formula (III):



in which, independently for each unit according to general formula (I) in which Y^1 conforms to general formula (III), each of R^3 and R^4 is independently a hydrogen atom, a C_1 to C_{10} alkyl moiety, or a C_1 to C_{10} hydroxyalkyl moiety, and X^2 is a hydrogen atom or a moiety Z^2 conforming to general formula (IV):



in which of R^5 and R^6 is independently a hydrogen atom, a C_1 to C_{10} alkyl moiety, or a C_1 to C_{10} hydroxyalkyl moiety; and

Y^2 , independently for each unit, is a hydrogen atom or, when Y^1 and Y^2 are bonded to adjacent carbon atoms in the aromatic ring shown in general formula (I), Y^1 and Y^2 , and said adjacent carbon atoms to which Y^1 and Y^2 are bonded together may constitute a condensed benzene ring,

said polymer molecules that comprise structural units conforming to general formula (I) having a total number of Z^1 and Z^2 moieties and a distinct (but not necessarily unequal) total number of (i) units conforming to general formula (I) and (ii) Y^1 moieties that conform to general formula (III), such that the total number of Z^1 and Z^2 moieties has a ratio to the total number of units conforming to general formula (I) and Y^1 moieties that conform to general formula (III) that is from 0.2:1.0 to 1.0:1.0;

and, optionally, at least one of the following components:

(B) phosphoric acid-type compounds; and

(C) organosilicon compounds,

said waterborne composition having a pH in a range from 2.5 to 6.5;

(II) contacting said surface of said metal substrate with the waterborne composition provided in step (I) for a sufficient time at a sufficient temperature to form a solid coating containing constituents of said waterborne composition, said solid coating adhering to said surface of said metal substrate and being itself covered, at least initially, by a coating of liquid;

(III) after step (II), drying the metal surface so as to remove from the metal surface the liquid constituents of the coating initially formed in step (II) or of a successor liquid coating formed by rinsing the surface of said metal substrate as modified after step (II) with water; and

(2) applying a film to the metal substrate coated with the composition provided according to step (1) to form a metal-coating-film laminate system whereby the method reduces industrial waste and minimizes gaseous emissions.

23
28. (New) A method of use of a coating composition in a film laminating process according to claim 27, in which Y¹ in general formula (I) conforms to general formula (III).

24
29. (New) A method of use of a coating composition in a film laminating process according to claim 28, in which the waterborne composition provided in step (I) comprises a total of at least 0.01 g/l of phosphorus atoms present in phosphoric acid-like compounds and silicon atoms present in organosilicon compounds.

25
30. (New) A method of use of a coating composition in a film laminating process according to claim 28, wherein the waterborne composition provided in step (I) contains at least 0.1 g/l of polymer molecules comprising units conforming to general formula (I) and the coating of liquid formed in step (II) is rinsed with water so as to form a successor coating before completion of step (III).

26
31. (New) A method of use of a coating composition in a film laminating process according to claim 30, in which the waterborne composition provided in step (I) comprises a total of at least 0.1 g/l of phosphorus atoms present in phosphoric acid-like compounds and silicon atoms present in organosilicon compounds.

27
32. (New) A method of use of a coating composition in a film laminating process according to claim 27, in which the coating system is applied to the metal substrate as a reactive coating.

28
33. (New) A method of use of a coating composition in a film laminating process according to claim 27, in which the coating system is applied to the metal substrate as a dry-in-place coating.

29
34. (New) A method of use of a coating composition in a film laminating process according to claim ~~27~~ 30, in which the metal substrate is selected from the group consisting of iron, steel, and aluminum.

30
35. (New) A method of use of a coating composition in a film laminating process according to claim ~~27~~ 30 wherein the film is selected from the group consisting of polyethylene, polycarbonate, polyester, and polymers of vinyl terephthalate.

09975523-101101
TOTAL 09975523-101101